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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/248,392	02/12/1999	HUBERTUS ALEXANDER SPAEPEN	GB97/023	8699

7590 12/03/2002

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EXAMINER
KUHAR, ANTHONY J

ART UNIT	PAPER NUMBER
1754	22

DATE MAILED: 12/03/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

mk - 22

Office Action Summary	Application No.	Applicant(s)	
	09/248,392	SPAEPEN, HUBERTUS ALEXANDER	
	Examiner	Art Unit	
	Anthony J Kuhar	1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 January 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

The request filed on 3/19/01 for a Continued Prosecution Application (CPA) under 37 CFR 1.53(d) based on parent Application No. 09/248392 is acceptable and a CPA has been established. An action on the CPA follows.

Specification

The abstract of the disclosure is objected to because it does not accurately describe the instantly claimed process since a calcium ion source is now claimed. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-22 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification does not disclose "channels" as recited by claim 1 and is therefore new matter in claim 1.

Also, "calcium ion source" is new matter in claims 1, 20, 21, and 22. It appears -- calcium ions -- was intended since it is the calcium ions which react according to the instant specification on page 9.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 22 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 22 is indefinite as to what the metes and bounds of the language is. It appears Markush language was intended.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-12, 19, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 96/23728 or FI 60183 B or Laine, "Manufacture of Precipitated Calcium Carbonate", each in view of Bunger '500.

WO 96/23728 teaches on page 5, lines 12-32 a process for carbonating calcium hydroxide by contacting slaked lime with carbon dioxide in a rapidly rotating mixer. Then the reactants proceed to a reactor where crystals grow. On page 6, lines 1-6, the mixing is again employed, along with an additional dosage of carbon dioxide (see page 12, lines 15-20). Page 6, lines 14-25 teach an impact mixer having vanes that cause the fluid to undergo a shearing force (changes in direction) and uniform mixing. WO 96/23728 does not teach the formation of fine bubbles during this mixing, although it appears this would occur because of the mixer and addition of carbon dioxide. Page 13, line 26 teaches a solids content of 12%. WO 96/23728 differs in that it does not teach having channels as reactors.

However, Bunger '500 teaches a similar process for the carbonation of calcium hydroxide, where a plug flow reactor is employed with multiple mixers. Essentially, the plug flow reactor can be considered a channel. Multiple mixers are taught in figure 2 along the channel. Column 3, lines 42-44 teach the plug flow reactor may have a plurality of injection sites for carbon dioxide along the length of the reactor (channel). The formation of small bubbles is taught in column 7, line 28. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the process of WO 96/23728 by using the

plug flow reactor (channel) with multiple sites for mixing and injection of carbon dioxide as taught by Bunger '500. One of ordinary skill in the art would have been motivated to make this combination because both processes relate to the continuous production of calcium carbonate and Bunger '500 teaches the plug flow system exploits the reaction kinetics of the system to produce small and uniformly sized calcium carbonate crystals (see column 7, lines 49-51). Neither reference teaches pressures at which the carbon dioxide enters the mixers or that the pressure falls from mixer to mixer or that there is independent pressure control at each mixing site; however, it would be obvious to one of ordinary skill in the art to employ independent pressure control at each mixing site and to choose the pressure at which the carbon dioxide enters for optimal performance. It is also well known in the art that channels, plug flow reactors, and pipes experience pressure drops due to viscous losses from flow and would also occur due to the loss of pressure during the reaction of carbon dioxide.

FI 60183 B teaches a process for the continuous production of calcium carbonate (see abstract). It teaches at least two consecutive mixing zones where flue gas is introduced into slaked lime. Concerning the use of 4-7 mixers, the subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to select the portion of the prior art's range which is within the range of applicant's claims because it has been held to be obvious to select a value in a known range by optimization for the best results, see In re Boesch, 205 USPQ 215. A dispersing device is also taught. FI 60183 B differs in that it does not teach channels as the reactors.

However, Bunger '500 teaches a similar process for the carbonation of calcium hydroxide, where a plug flow reactor is employed with multiple mixers. Essentially, the plug

flow reactor can be considered a channel. Multiple mixers are taught in figure 2 along the channel. Column 3, lines 42-44 teach the plug flow reactor may have a plurality of injection sites for carbon dioxide along the length of the reactor (channel). The formation of small bubbles is taught in column 7, line 28. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the process of FI 60183 B by using the plug flow reactor (channel) with multiple sites for mixing and injection of carbon dioxide as taught by Bunger '500. One of ordinary skill in the art would have been motivated to make this combination because both processes relate to the continuous production of calcium carbonate and Bunger '500 teaches the plug flow system exploits the reaction kinetics of the system to produce small and uniformly sized calcium carbonate crystals (see column 7, lines 49-51). Neither reference teaches pressures at which the carbon dioxide enters the mixers or that the pressure falls from mixer to mixer or that there is independent pressure control at each mixing site or that the mixer has internal vanes that cause the suspension to undergo changes in direction; however, it would be obvious to one of ordinary skill in the art to employ independent pressure control at each mixing site and to choose the pressure at which the carbon dioxide enters for optimal performance. It is also well known in the art that channels, plug flow reactors, and pipes experience pressure drops due to viscous losses from flow and would also occur due to the loss of pressure during the reaction of carbon dioxide. It would also be obvious to one of ordinary skill in the art to employ mixers with vanes that cause changes in the direction of flow because this results in better mass transfer due to more uniform dissolution of bubbles for reaction.

Laine, "Manufacture of Precipitated Calcium Carbonate" teaches a process for the continuous production of calcium carbonate (see abstract). It teaches two consecutive mixing zones where flue gas is introduced into slaked lime. A decrease in hydrostatic pressure is taught on the second page, middle column. Impellers are also taught on the third page. Laine, "Manufacture of Precipitated Calcium Carbonate" differs in that it does not teach channels as the reactors.

However, Bunger '500 teaches a similar process for the carbonation of calcium hydroxide, where a plug flow reactor is employed with multiple mixers. Essentially, the plug flow reactor can be considered a channel. Multiple mixers are taught in figure 2 along the channel. Column 3, lines 42-44 teach the plug flow reactor may have a plurality of injection sites for carbon dioxide along the length of the reactor (channel). The formation of small bubbles is taught in column 7, line 28. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the process of Laine by using the plug flow reactor (channel) with multiple sites for mixing and injection of carbon dioxide as taught by Bunger '500. One of ordinary skill in the art would have been motivated to make this combination because both processes relate to the continuous production of calcium carbonate and Bunger '500 teaches the plug flow system exploits the reaction kinetics of the system to produce small and uniformly sized calcium carbonate crystals (see column 7, lines 49-51). Neither reference teaches pressures at which the carbon dioxide enters the mixers or that there is independent pressure control at each mixing site or that the mixer has internal vanes that cause the suspension to undergo changes in direction; however, it would be obvious to one of ordinary skill in the art to employ independent pressure control at each mixing site and to choose the

pressure at which the carbon dioxide enters for optimal performance. It would also be obvious to one of ordinary skill in the art to employ mixers with vanes that cause changes in the direction of flow because this results in better mass transfer due to more uniform dissolution of bubbles for reaction.

Claims 1-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 96/23728 or FI 60183 B or Laine, "Manufacture of Precipitated Calcium Carbonate", each in view of Bunger '500 and further in view of EP 0604 095 A1.

The prior art rejection of WO 96/23728 or FI 60183 B or Laine, "Manufacture of Precipitated Calcium Carbonate", each in view of Bunger '500 is applied as above.

WO 96/23728 and FI 60183 B and Laine, "Manufacture of Precipitated Calcium Carbonate" and Bunger '500 do not teach entraining and bonding non-consumable solids to precipitated calcium carbonate. However, EP 0604 095 A1 discloses an aqueous suspension of a particulate waste material, which comprises the step of precipitating an alkaline earth metal carbonate in the said aqueous suspension of the particulate material whereby the said particulate material present at the start of the process becomes entrained in the alkaline earth metal carbonate precipitate (see Abstract). The aggregated product of such a process, which have advantageous properties when used in paper making or paper coating, or when used as a filler or extender for paints, plastics compositions and the like. The waste material is by-products of wet mineral refining processes and waste waters from paper mills (pg. 2, ln. 1-3). The aqueous suspension is preferably dilute, which contains no more than about 20% by weight of the dry particulate material on a dry weight basis, more preferably less than 10% by weight thereof (pg.

3, ln. 4-7). The particulate material, which is an industrial by-product such as finely divided kandite clay mineral such as kaolin, a smectite clay such as bentonite, montmorillonite, saponite, hectorite or beidellite, paper mill effluent (which is normally a mixture of cellulose fibers and in organic fillers) (pg. 3, ln. 8-11). The alkaline earth metal carbonate is most preferably a calcium carbonate. The alkaline earth metal carbonate precipitate may be formed by introducing into the suspension of the particulate mineral a source of alkaline earth metal ions and a source of carbonate ions. This will form the desired precipitate of alkaline earth metal carbonate in situ which will entrain the particulate mineral (pg. 3, ln. 26-30). Thus, it would have been obvious to one of ordinary skill in the art to use non-consumable solids, such as fibers and /or particles, in the process of the recited prior art because EP 604 095 A1 teaches that the aggregated product, such as calcium carbonate, of such a process would have advantageous properties when used in paper making or paper coating, or when used as a filler or extender of paints, plastics compositions, and the like.

Applicant's arguments with respect to claims 1-21 have been considered but are moot in view of the new ground(s) of rejection.

Regarding the declaration, continuously stirred CSTRs and many types of other reactors including plug-flow reactors with multiple sites for injection of reactant are known in introductory chemical reaction engineering literature. These essentially act as the channel as claimed by applicant since they are often long and cylindrical. It is the opinion of the examiner

that one of ordinary skill in the art would envision a channel as claimed by applicant, in view of the applied references.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony J Kuhar whose telephone number is 703-305-7095. The examiner can normally be reached on 8:45 am - 5:15 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stan Silverman can be reached on 703-308-3837. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-305-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

AK

AK
November 21, 2002

STEVEN BOS
PRIMARY EXAMINER
GROUP 1100